

## Research Objective

Develop chemical technologies and computational approaches to enable the step-efficient synthesis of structurally complex natural products with potential applications to neuroscience.

## Appointments

Associate Professor of Chemistry, Member Interdepartmental Neuroscience Program  
Yale University, New Haven, CT, 2018-present

Assistant Professor of Chemistry, Member Interdepartmental Neuroscience Program  
Yale University, New Haven, CT, 2013-2018

## Education

Postdoctoral Research Fellow, Harvard University, Cambridge, MA, 2010-13  
Enantioselective organometallic methods development with E.J. Corey

Ph.D., Organic Chemistry, The Scripps Research Institute, La Jolla, CA, 2006-10  
Natural product synthesis with Phil S. Baran  
Reaction mechanism investigation with Donna G. Blackmond

B.A., Chemistry with Honors, *summa cum laude*, Colby College, Waterville, ME, 2001-05  
Study of reactive intermediates with Dasan M. Thamattoor

## Awards and Honors

|         |  |
|---------|--|
| 2021    | Boehringer Ingelheim Scientific Advancement Grant                    |
| 2020    | Genentech Research Innovation Award                                  |
| 2019    | Arthur C. Cope Scholar Early Career Award, American Chemical Society |
| 2019    | PRF New Directions, American Chemical Society                        |
| 2019    | Camille Dreyfus Teacher-Scholar Award                                |
| 2018    | Amgen Young Investigator Award                                       |
| 2018    | Dylan Hixon '88 Prize for Teaching Excellence                        |
| 2017    | Academic Young Investigator, American Chemical Society               |
| 2017    | Sloan Research Fellowship  |
| 2017    | NSF CAREER   |
| 2015    | Rosenkranz Award   |
| 2015    | Thieme Chemistry Journal Award                                       |
| 2014    | Anderson Award   |
| 2010-13 | Bristol Myers Squibb Postdoctoral Fellowship                         |
| 2012    | Harvard Postdoctoral Award for Professional Development              |
| 2011    | Reaxys PhD Prize Finalist  |

**Awards and Honors (cont.)**

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|------|--|
| 2008 | Bristol Myers Squibb Graduate Fellowship                   |
| 2008 | Scripps Best Talk Award, Graduate Retreat, Chemistry       |
| 2005 | The "Sarge" Award in Chemistry for departmental leadership |
| 2005 | Phi Beta Kappa Society member                              |
| 2004 | Wayne L. Smith Inorganic Chemistry Award                   |
| 2003 | Bradford P. Mundy Organic Chemistry Award                  |
| 2003 | Merck/AAAS Undergraduate Research Scholar                  |

**Independent Publications**

45. D. Huang, T. R. Newhouse.\* "Palladium and Nickel-Catalyzed Dehydrogenation Using Unconventional Oxidants and Their Applications in Natural Products Synthesis" *Acc. Chem. Res.* [online]
44. A. K. Bodnar, A. Turlik, D. Huang, W. Butcher, J. K. Lew, and T. R. Newhouse\* "Preparation of Hindered Aniline CyanH and Application in the Allyl-Ni-Catalyzed  $\alpha,\beta$ -Dehydrogenation of Carbonyls" *Org. Synth.*, **2020**, Submitted
43. P. Zhang, T. R. Newhouse.\* "Thiophene, 2-bromo-5-methyl-" *Encyclopedia for Reagents in Organic Synthesis*. **2020**, [Accepted]
42. D. Olivieri, D. Huang, A. K. Bodnar, S. Yu, T. R. Newhouse.\* "Zinc-mediated anionic cyclization of unstabilized ketone enolates with unactivated alkenes" *Tetrahedron*. **2020**, 76, 131417.
41. A. W. Schuppe, Y. Liu, T. R. Newhouse.\* "An Invocation for Computational Evaluation of Isomerization Transforms: Cationic Skeletal Reorganizations as a Case Study" *Nat. Prod. Rep.* **2020**, DOI: 10.1039/D0NP0005A
40. Y. Liu, T. A. Holt, A. Kutateladze, T. R. Newhouse.\* "Stereochemical Revision of Xylogranatin F by GIAO and DU8+ NMR Calculations" *Chirality*. **2020**, 32, 515.
39. P. Zhang, D. Huang, T. R. Newhouse.\* "Aryl-Nickel-Catalyzed Benzylic Dehydrogenation of Electron-Deficient Heteroarenes" *J. Am. Chem. Soc.* **2020**, 142, 1757.
38. D. Huang, D. Olivieri, Y. Sun, P. Zhang, T. R. Newhouse.\* "Nickel-Catalyzed Difunctionalization of Unactivated Alkenes Initiated by Unstabilized Enolates." *J. Am. Chem. Soc.* **2019**, 141, 16249.
37. A. W. Schuppe, Y. Zhao, Y. Liu, T. R. Newhouse.\* "Total Synthesis of (+)-Granatumine A and Related Bislactone Limonoid Alkaloids via a Pyran to Pyridine Interconversion." *J. Am. Chem. Soc.* **2019**, 141, 919.
36. P. Zhang, T. R. Newhouse.\* "Oxidation Stepping Stones:  $\alpha$ -Oxytriflation Enables Asymmetric Arylation of Amides." *Chem* **2019**, 5, 1883.

35. A. Turlik, Y. Chen, A. C. Scruse, and T. R. Newhouse.\* “Convergent Total Synthesis of Principinol D, a Rearranged Kaurane Diterpenoid.” *J. Am. Chem. Soc.* **2019**, *141*, 8088.
34. J. E. Zweig, T. A. Ko, J. Huang, T. R. Newhouse.\* “Effects of  $\pi$ -Extension on Pyrrole Hemithioindigo Photoswitches.” *Tetrahedron*. **2019**, *75*, 130466.
33. D. Huang, S. M. Szewczyk, P. Zhang, T. R. Newhouse.\* “Allyl-Nickel Catalysis Enables Carbonyl Dehydrogenation and Oxidative Cycloalkenylation of Ketones” *J. Am. Chem. Soc.* **2019**, *141*, 5669.
32. D. E. Kim, J. E. Zweig, T. R. Newhouse.\* “Total Synthesis of Paspaline A and Emindole PB Enabled by Computational Augmentation of a Transform-Guided Retrosynthetic Strategy” *J. Am. Chem. Soc.* **2019**, *141*, 1479.
31. M. Elkin, A. C. Scruse, A. Turlik, T. R. Newhouse.\* “Computational and Synthetic Investigation of Cationic Rearrangement in the Putative Biosynthesis of Justicane Triterpenoids” *Angew. Chem. Int. Ed.* **2019**, *58*, 1025.
30. R. A. Coleman, C. S. Muli, Y. Zhao, A. Bhardwaj, T. R. Newhouse, D. J. Trader.\* “Analysis of chain length, substitution patterns, and unsaturation of AM-404 derivatives as 20S proteasome stimulators” *Bioorganic Med. Chem. Lett.* **2019**, *29*, 420.
29. D. E. Kim, Y. Zhu, T. R. Newhouse.\* “Vinylogous acyl triflates as an entry point to  $\alpha,\beta$ -disubstituted cyclic enones via Suzuki–Miyaura cross-coupling.” *Org. Biomol. Chem.* **2019**, *17*, 1796.
28. M. Elkin, T. R. Newhouse.\* “Computational chemistry strategies in natural product synthesis.” *Chem. Soc. Rev.* **2018**, *47*, 7830.
27. H.-J. Zhang, A. W. Schuppe, S.-T. Pan, J.-X. Chen, B.-R. Wang, T. R. Newhouse,\* and L. Yin.\* “Copper-Catalyzed Vinylogous Aerobic Oxidation of Unsaturated Compounds with Air.” *J. Am. Chem. Soc.* **2018**, *140*, 5300.
26. S. M. Szewczyk, Y. Zhao, H. Sakai, P. Dube, T. R. Newhouse.\* “ $\alpha,\beta$ -Dehydrogenation of esters with free O-H and N-H functionalities via allyl-palladium catalysis.” *Tetrahedron*, **2018**, *74*, 3293.
25. A. W. Schuppe, D. Huang, Y. Chen, T. R. Newhouse.\* “Total Synthesis of (-)-Xylogranatopyridine B via a Palladium-Catalyzed Oxidative Stannylation of Enones.” *J. Am. Chem. Soc.* **2018**, *140*, 2062.
24. D. Huang, Y. Zhao, T. R. Newhouse.\* “Synthesis of Cyclic Enones by Allyl-Palladium-Catalyzed  $\alpha,\beta$ -Dehydrogenation.” *Org. Lett.* **2018**, *20*, 684.
23. Y. Zhao, Y. Chen, T. R. Newhouse.\* “Allyl-Palladium Catalyzed  $\alpha,\beta$ -Dehydrogenation of Carboxylic Acids via Enediolates” *Angew. Chem. Int. Ed.* **2017**, *56*, 13132.

22. J. Zweig, T. R. Newhouse.\* “Isomer-Specific Hydrogen Bonding as a Design Principle for Bidirectionally Quantitative and Redshifted Hemithioindigo Photoswitches” *J. Am. Chem. Soc.* **2017**, *139*, 10956.
21. G. Xu, M. Elkin, D. J. Tantillo, T. R. Newhouse,\* T. J. Maimone.\* “Traversing Biosynthetic Carbocation Landscapes in the Total Synthesis of Andrastin and Terretinin Meroterpenes.” *Angew. Chem. Int. Ed.* **2017**, *56*, 12498.
20. Y. Chen, D. Huang, Y. Zhao, T. R. Newhouse.\* “Allyl-Palladium Catalyzed Ketone Dehydrogenation Enables Telescoping with Enone  $\alpha,\beta$ -Vicinal Difunctionalization” *Angew. Chem. Int. Ed.* **2017**, *56*, 8258.
19. J. Zweig, D. Kim, T. R. Newhouse.\* “Methods Utilizing First-Row Transition Metals in Natural Product Total Synthesis.” *Chem. Rev.* **2017**, *117*, 11680.
18. A. W. Schuppe, J. M. Cabrera, C. L. McGeoch, T. R. Newhouse.\* “Scalable synthesis of enamines utilizing Gold's reagents.” *Tetrahedron*, **2017**, *73*, 3643.
17. M. Elkin, S. M. Szewczyk, A. C. Scruse, T. R. Newhouse.\* “Total Synthesis of Berkeleyone A.” *J. Am. Chem. Soc.* **2017**, *139*, 1790.
16. A. W. Schuppe, T. R. Newhouse.\* “Assembly of the Limonoid Architecture by a Divergent Approach: Total Synthesis of Andriolide N via 8 $\alpha$ -hydroxycarapin.” *J. Am. Chem. Soc.* **2017**, *139*, 631.
15. D. Huang, A. W. Schuppe, M. Z. Liang, T. R. Newhouse.\* “Scalable procedure for the fragmentation of hydroperoxides mediated by copper and iron tetrafluoroborate salts.” *Org. Biomol. Chem.* **2016**, *14*, 6197.
14. Y. Chen, A. Turlik, T. R. Newhouse.\* “Amide  $\alpha,\beta$ -Dehydrogenation Using Allyl-Palladium Catalysis and a Hindered Monodentate Anilide.” *J. Am. Chem. Soc.* **2016**, *138*, 1166.
13. A. Turlik, Y. Chen, T. R. Newhouse.\* “Dehydrogenation Adjacent to Carbonyls Using Pd-Allyl Intermediates.” *Synlett*, **2016**, *27*, 331.
12. Y. Chen, J. P. Romaine, T. R. Newhouse.\* “Palladium-Catalyzed  $\alpha,\beta$ -Dehydrogenation of Esters and Nitriles.” *J. Am. Chem. Soc.* **2015**, *137*, 5875.

## Mentored Publications

11. R. I. Goldstein, R. Guo, C. Hughes, D. P. Maurer, T. R. Newhouse, T. J. Sisto, R. R. Conry, S. L. Price, D. M. Thamattoor.\* “Concomitant Conformational Dimorphism in 1,2-Bis(9-anthryl)acetylene” *CrystEngComm* **2015**, *17*, 4877.
10. T. R. Newhouse, P. Kaib, A. Gross, E. J. Corey.\* “Versatile Approaches for the Synthesis of Chiral Fused-Ring  $\gamma$ -Lactones Utilizing Cyclopropane Intermediates.” *Org. Lett.* **2013**, *15*, 1591.

9. L. Zou, R. S. Paton,\* A. Eschenmoser, T. R. Newhouse, P. S. Baran, K. N. Houk.\* “Enhanced Reactivity in Dioxirane C-H Oxidations via Strain Release.” *J. Org. Chem.* **2013**, *78*, 4037.
8. T. R. Newhouse, X. Li, M. M. Blewett, C. M. C. Whitehead, E. J. Corey.\* “A Tetradentate Ligand for the Enantioselective Ti(IV)-Promoted Oxidation of Sulfides to Sulfoxides: Origin of Enantioselectivity.” *J. Am. Chem. Soc.* **2012**, *134*, 17354.
7. T. Newhouse, P. S. Baran.\* “If C-H Bonds Could Talk: Selective C-H Bond Oxidation.” *Angew. Chem. Int. Ed.* **2011**, *50*, 3362.
6. K. Foo, T. Newhouse, H. Takayama, P. S. Baran.\* “Total Synthesis – Guided Structure Elucidation of (+)-Psychotetramine.” *Angew. Chem. Int. Ed.* **2011**, *50*, 2716.
5. T. Newhouse, C. A. Lewis, K. J. Eastman, P. S. Baran.\* “Scalable Total Syntheses of *N*-Linked Tryptamine Dimers by Direct Indole-Aniline Coupling: Psychotrimine and Kapakahines B and F.” *J. Am. Chem. Soc.* **2010**, *132*, 7119.
4. M. A. Schallenberger, T. Newhouse, P. S. Baran, F. E. Romesberg.\* “The Psychotrimine Natural Products Have Antibacterial Activity Against Gram-Positive Bacteria and Act Via Membrane Disruption.” *J. Antibiot.* **2010**, *63*, 685.
3. T. Newhouse, P. S. Baran,\* R. W. Hoffmann.\* “The Economies of Synthesis.” *Chem. Soc. Rev.* **2009**, *38*, 3010.
2. T. Newhouse, C. A. Lewis, P. S. Baran.\* “Enantiospecific Total Syntheses of Kapakahines B and F.” *J. Am. Chem. Soc.* **2009**, *131*, 6360.
1. T. Newhouse, P. S. Baran.\* “Total Synthesis of (±)-Psychotrimine.” *J. Am. Chem. Soc.* **2008**, *130*, 10886.

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